Good Practice Guide

Quality Laboratory Facilities

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Good Practice Guide

Quality Laboratory Facilities

Disclaimer:
This Guide describes how to apply a risk assessment to a quality laboratory facility and identify issues to be considered. The purpose of the quality laboratory is to support the execution of testing that assures the manufactured products meet the identity, strength, purity, efficacy, and safety as specified in an approved regulatory file. ISPE cannot ensure and does not warrant that a system managed in accordance with this Guide will be acceptable to regulatory authorities. Further, this Guide does not replace the need for hiring professional engineers or technicians.

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Preface

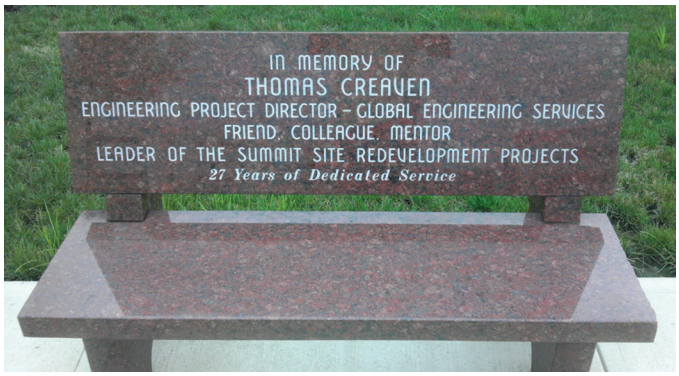
The ISPE Good Practice Guide: Quality Laboratories Facilities aims to provide a baseline for the design of pharmaceutical quality laboratories supporting GxP regulated facilities producing pharmaceutical products. This Guide is intended to assist in the development of criteria for determining system impact and component criticality for a quality laboratory. It considers critical early planning decisions and questions, such as through-puts and the consequences of location. Guidance is provided on how to apply a risk assessment to a quality laboratory facility and identify issues to be considered.

Special Dedication to Tom Creaven

This Guide is dedicated to the memory of Tom Creaven, who was responsible for the Architectural Chapter until his passing at which time William Ferguson assumed the responsibility.

Tom Creaven's career spanned more than 25 years at Schering Plough and he was a Director of Global Engineering Services. He served as one of the company representatives to ISPE and was the main contact person for Schering Plough's Global Engineering Team. Tom was involved in a significant number of the projects for Schering Plough and had responsibility for the construction of laboratory facilities, office buildings, and manufacturing facilities. One of his last projects for the firm was the construction of a new cGMP Clinical Research Manufacturing Facility in Summit, N.J. This project was very successful and involved the use of modular construction to expedite the delivery of the facility. Tom was heavily involved in the remediation of the manufacturing site in Kenilworth to comply with the consent decree requirements. This led to the construction of new tablet manufacturing facility that at the time was state of the art when it was completed.

Tom was a licensed Professional Engineer in the state of N.J. and was an active member of ISPE for more than 20 years. He was a mentor to countless young engineers and a consummate professional who ensured that the firm paid attention to detail. Tom was an advocate for the ISPE Baseline Guides and promoted their use as a tool for engineering. Tom's legacy lives on today in the scores of junior colleagues that benefited from his training and guidance over the years, in addition to the friendships that he made with ISPE members, contractors, engineers, and other professionals. He is sorely missed by all.



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1 Background and Purpose

1.1 Background

Quality laboratories execute testing protocols to establish the stability baseline of materials and products, for initial material release, for in-process verifications, for final product release, and to investigate product complaints. The quality laboratory scientists develop and execute tests to guarantee the quality, integrity, and stability of pharmaceutical and animal care products and their components at each stage of a manufacturing process. Their analytical methods are defined in Standard Operating Procedures (SOPs). These methods are used to assure compliance to design and performance specifications prior to release of products to the market.

The quality control function is to verify the quality of the product and its components at each stage of manufacturing through a variety of diagnostic methods. The quality laboratory facility supports the scientists in executing these tests. The tests being performed verify that materials and products meet the necessary criteria to allow for the approval of materials at receiving, the movement of in-process materials from operation to operation and the final release for distribution. The quality laboratory is responsible for testing and release for both in house and outsourced manufacturing, packaging, and distribution. In addition, the quality laboratory supports the testing necessary for stability studies as well as clinical trial manufacturing, packaging, and distribution.

Quality operations are typically responsible for ongoing facility and utility monitoring. In addition, the Quality Control Department supports the commissioning and validation of new facilities in preparation for their release for use.

The application of this Guides' recommendations to a particular laboratory operation should be based on a risk assessment of the testing platforms being applied and the activities being performed. It should not be considered as a universal and generic code applied to all situations. The laboratory under consideration should be defined in concert with the laboratory management documenting their requirements and special needs. The design development team then participates in a joint venture risk assessment performed in concert with their scientific client to reach agreement on the characteristics of the facility to meet the agreed upon risk.

Quality control laboratories can be quite simplistic. Package testing laboratories can be an open room with no special considerations other then security of the samples being tested and verified. In-process control may be performed in rooms close to the physical operation. On the other hand, product testing may require, no to high levels of isolation, depending on the test being performed and the potency of the product being tested. Microbiology laboratories require levels of storage and isolation to protect the samples being tested and the individuals performing the tests. Microbiology laboratories have levels of isolation and safety equipment, including biological safety cabinets and a variety of enclosure containers, to provide containment of aerosols generated by many microbiological procedures. Different levels of isolation are provided depending on the biological compounds hazard level. The three elements of containment include laboratory practice and technique, safety equipment, and facility design.

The most important element to safety of the scientist is adherence to standard practices and techniques. Persons working with agents and materials must be aware of the potential hazards and must be trained and proficient in practices and techniques necessary for safely handling of such materials. The director or person in charge of the laboratory is responsible for providing and arranging for appropriate training of personnel and developing of the approved SOPs documenting these techniques and practices.

Each laboratory should develop an operations manual that identifies the hazards that will or may be encountered, and that specifies practices and procedures followed to minimize or eliminate exposures to these hazards. Personnel should be advised of special hazards and should be obliged to read and follow the necessary practices and procedures. A scientist, trained and knowledgeable in appropriate laboratory techniques, safety procedures, and hazards associated with handling the agents and materials to be tested must be responsible for the conduct of work with any agents or materials.

When standard laboratory practices are not sufficient, additional measures may be needed. The scientist or group trained and knowledgeable in appropriate laboratory techniques, safety procedures, and hazards associated with handling the agents and materials to be tested must be involved in the facility design and engineered features and safety equipment. In addition, it would be a best practice to have this team involved in the risk assessment process to be assured all are in agreement with the final facilities and safety equipment to be employed in the delivered laboratory. The design of the laboratory contributes to the laboratory workers' protection, provides a barrier to protect persons outside the laboratory, and protects persons in the community from agents that may be accidentally released.

1.2 Purpose

The purpose of the quality laboratory is to support the execution of testing that assures the manufactured products meet the identity, strength, purity, efficacy, and safety as specified in an approved regulatory file. It is important to note that a quality laboratory verifies product quality and does not affect product quality. When a quality test fails, i.e., the product fails to meet specifications, the material is quarantined, rejected, or subjected to further test procedures or rework.

The design of the quality laboratory should minimize or eliminate the risk of the facility contributing risk to patient safety through test function failure to detect an Out of Specification (OOS) product. This type of failure may be derived from laboratory conditions or because of a support system malfunction.

Regulatory initiatives and guidelines emphasize the principles of managing risk and the application of these techniques to pharmaceutical facility inspections and submission review. For a quality laboratory and its associated utilities and support systems, a documented risk assessment can identify those areas or systems having an impact on product quality and quality control functions, and provide a rationale for commissioning, verification, and qualification decisions.

1.3 Objectives

This Guide aims to assist project teams in the development of criteria for determining system impact and component criticality for a quality laboratory project. Using these requirements and design documentation, a review of the intended purpose of a laboratory area or the type of testing to be performed in a laboratory area may identify potential risks inherent in the design. Guidance is provided on how to apply a risk assessment to a quality laboratory facility and identify issues to be considered. Managing risk allows a consistent and science-based approach to decision making, across the life cycle of a product or project.

This Guide presents design guidelines focused on pharmaceutical quality laboratories within or part of a GxP regulated environment. Quality laboratories range across various functions, testing platforms, and product types.

This Guide aims to:

- Provide a baseline for the design of pharmaceutical quality laboratories supporting GxP regulated facilities producing pharmaceutical products for human and animal applications
- Assist in the interpretations of function, operation, or design for quality laboratories within the GxP regulatory environment
- Encourage and guide consistency in the baseline design and performance of quality laboratories
- Help to reduce costs in producing pharmaceutical products for human applications[1]

[1] May also apply to animal applications.

1.4 Scope of This Guide

This Guide considers:

- Critical early planning decisions and questions, such as through-puts, as determinants of size and capacity, and the consequences of location, e.g., adjacent to or remote from manufacturing, centralized, or decentralized locations
- Identification and characterization of laboratories and support spaces
- The role of regulation via the GxPs and CFR 21 Part 11 [1]
- The parallel and controlling role of prevailing building codes and building regulations
- Prevailing critical industry and association standards related to systems and subsystems
- Systems necessary to support quality laboratory operations
- Various disciplines (e.g., architectural/HVAC/plumbing and fire protection/electrical), design philosophy, design approach, and appropriate alternatives
- Subsystems such as security, monitoring and instrumentation, and IT and electronic data capture
- Construction costs and their control

This Guide supports and references other ISPE Guidance Documents and provides associated examples. The relevant ISPE Guidance Documents should be consulted for regulatory expectations in a specific topic area.

1.5 Issues Which Define the Design of Quality Laboratories

Maintaining Good Laboratory Practice (GLP) is a prerequisite of an effective and efficient operation. This can be accomplished through:

- Security
- Product and people flow
- Environmental control and pressurization
- Monitoring
- IT systems
- Electronic data
- Documentation
- Sample storage and long term retention

Critical aspects for establishing a laboratory environment include:

- The tests being performed and the equipment to support those tests